

Risk = Hazard + Outrage

The Peter Sandman Risk Communication Website

A Promising Candidate for Most Dangerously Dishonest Public Health News Release of the Year

by Peter M. Sandman

This column is about electronic cigarettes (e-cigs), specifically about an April 2015 news release from the U.S. Centers for Disease Control and Prevention (CDC) that dishonestly and dangerously misrepresented the findings of a survey report on tobacco use (including e-cigs) by high school and middle school students. The report itself is similarly dishonest, and the CDC press briefing on the report was even worse. I'll talk about those too – but it was the release that had the potential to do the most harm.

Orientation to e-cig issues

By way of orientation, here are some beliefs I hope most readers will share after reading this column, if not before:

Column Table of Contents

Orientation to e-cig issues

The MMWR report

The news release

The press briefing

On kids' overall use of tobacco products

On the health effects of nicotine

On the gateway-versus-replacement debate

The coverage

Conclusion

1. Cigarette smoking is incredibly dangerous. It ranks high on any reasonable list of preventable causes of mortality and morbidity. So preventing or reducing cigarette smoking, especially among the young, rightly ranks high on the agenda of any responsible public health agency. (I get it that it's possible to disagree on the grounds that public health agencies simply shouldn't be spending tax dollars trying to affect people's voluntary self-damaging behavior. Second-hand smoke exposure isn't voluntary, but it's also significantly less hazardous than smoking itself.)

What's dangerous about smoking is overwhelmingly the tar produced when tobacco

- 2.** is burned. It's the nicotine in tobacco that makes smoking addictive, but it's mostly the tar that makes smoking deadly. There are risks associated with nicotine too, and risks associated with various tobacco additives. But they are tiny in comparison. Most smoking-related health effects are from the smoke. Nicotine addiction drives people to keep smoking, but it's mainly the tar in the smoke that makes them sick.

- 3.** E-cigarettes are a delivery vehicle for nicotine-containing vapor. E-cigs do not burn tobacco and do not release tar. The addictiveness of e-cigs is comparable to the addictiveness of real cigs. The risk to health, however, is not comparable. There are some known hazards associated with vaping electronic cigarettes; there are other hypothesized hazards that seem likely or at least possible. But the total known and credibly hypothesized risk of vaping is at least a couple of orders of magnitude smaller than the known risk of smoking. Even CDC head Tom Frieden, whose fervid opposition to e-cigs is unquestioned, concedes that "stick to stick" e-cigs are safer than real cigs.

- 4.** Since e-cigs haven't been popular for decades yet, it is theoretically possible that there is some huge, unexpected, long-latency, devastating health surprise lurking in the futures of vapers. But for e-cigs to turn out anywhere near as dangerous as real cigs would be a shock, as unlikely as discovering (as per the 1973 Woody Allen film "Sleeper") that chocolate is a cure for cancer.

- 5.** It follows that the most important health question about e-cigs, by far, is how vaping affects smoking, and therefore smoking risk.

- 6.** It is possible that vaping increases smoking risk. E-cigs could turn out to be a gateway to real cigs. A nonsmoker, perhaps an adolescent, who would have forever resisted the temptation to start smoking (knowing it to be very dangerous) might be less resistant to the temptation to start vaping – perhaps precisely because vaping is much less dangerous. Then the pleasures of vaping might start to pall and the vaper might move on to cigarettes instead (or as well).

- 7.** It is possible that vaping decreases smoking risk. E-cigs could turn out to be a replacement for real cigs. A smoker who feels unable to quit cold turkey might switch to e-cigs, in whole or in part – and might then quit entirely (or keep vaping forever). Or a nonsmoker who would otherwise have started smoking, perhaps an adolescent seeking the pleasures of nicotine and the security of a cigarette-like prop, might start vaping instead, and might keep vaping forever (or quit vaping eventually), never moving on to cigarettes.

- 8.** Since vaping is much less hazardous than smoking, the health effects of vaping itself (though still worth considering) are much less important than the degree to which vaping leads to smoking versus the degree to which it replaces smoking. Thus:

- Insofar as vaping leads to smoking – that is, if nonsmokers who would otherwise have eschewed tobacco altogether decide to vape and then later decide to smoke – then e-cigs do major public health harm. Call that the big bad effect.
- Insofar as vaping replaces no tobacco use – that is, if smokers switch to vaping instead of quitting entirely, or if nonsmokers decide to vape instead of avoiding all sources of nicotine – then e-cigs do comparatively minor public health harm. Call that the small bad effect.
- Insofar as vaping replaces smoking – that is, if smokers switch to vaping instead of continuing to smoke, or if prospective smokers decide to vape instead of starting to smoke, or if smokers vape some of the time when they would otherwise have smoked – then e-cigs do major public health good. Call that the

big good effect.

9. We have more and more data about the comparative size of these three effects – the big bad effect, the small bad effect, and the big good effect. But there aren't that many good studies yet, especially long-term studies. There isn't a solid basis for a consensus scientific judgment. I suspect the third effect – the big good effect – outweighs the other two. But I'm guessing, and there are certainly people whose guesses go the other way. This is one case where "Further research is needed" is the God's honest truth. Further research is *badly* needed. We really need to know ASAP whether vaping does mostly harm or mostly good, so we can work on public policies to discourage or encourage it. We need to know this overall, and we need to know it for specific target groups such as adolescents.
10. Arguably in the meantime, when we don't know whether vaping does mostly harm or mostly good, we should neither discourage nor encourage it. But not necessarily. You could make a case that any possible threat to health, especially an addictive one, needs to be stopped (at least in adolescents) before it becomes too rooted to stop, that we have no business permitting – far less encouraging – e-cigs unless we have convincing evidence that the good outweighs the harm. Or you could make a case that any source of pleasure and voluntary economic activity deserves the benefit of the doubt, that we have no business regulating e-cigs without convincing evidence that the harm outweighs the good.
11. Adolescents ideally should not have access to any nicotine delivery product. The longer we can postpone their decisions about tobacco use, the wiser those decisions are likely to be – and the less damage they will do to their health if they decide unwisely. But despite strenuous prevention efforts, American teenagers have long had easy access to combustible tobacco, and now have easy access to e-cigs as well. A policy of equal opposition to all tobacco products makes less public health sense than a policy that takes the comparative risk of different tobacco products into consideration. This is compatible with the public health principle of harm reduction.
12. Why don't we know yet whether e-cigs are likelier to lead to smoking or to replace smoking? One problem is that the research so far doesn't yield clear conclusions, even clear tentative conclusions. Many of the studies contradict each other; many are hard to interpret. Another problem is that the studies can't necessarily be trusted. Or at least the "Introduction," "Discussion," and "Conclusions" sections of the studies can't necessarily be trusted. Maybe the "Results" sections are trustworthy; I have no way to know.
13. Studies done or sponsored by the e-cig industry are by definition untrustworthy, no matter how accurate or misleading they may actually be, simply because the industry has an obvious stake in the outcome. But in an ideal world we would have reason to trust studies done or sponsored by public health agencies. After all, reducing smoking risk is a top priority for these agencies. So they should want to find out – objectively – whether e-cigarettes are a dangerous step backwards or a useful tool.
14. They should want to find out – but they seem to think they already know. Many if not most public health agencies have decided on ideological grounds that e-cigs are a dangerous step backwards. They may design their studies to validate that predetermined position. They frequently interpret their studies to do so.

Which brings me to my candidate for the most dangerously dishonest public health news release of the year. I'll start with the survey report on which the release was based.

The MMWR report

"Tobacco Use Among Middle and High School Students – United States, 2011–2014" appeared in the April 17, 2015 issue of the CDC's flagship publication, *Morbidity and Mortality Weekly Report* (MMWR). Its 12 authors are all affiliated with the CDC's Office on Smoking and Health or the Center for Tobacco Products of the U.S. Food and Drug Administration (FDA).

The report analyzes data from the 2011–2014 National Youth Tobacco Surveys. These annual surveys ask a sample of public school students whether they have used each of various tobacco products at least once in the previous month. There is no measure in this particular instrument of how often or how long students used each of the products, just whether or not they cop to at least one recent use. Nine products are currently covered. Five produce smoke: cigarettes, cigars, hookahs (water pipes), ordinary pipes, and bidis (thin, hand-rolled cigarettes from South Asia). The other four are smokeless tobacco (chewing tobacco, dipping tobacco, snuff, etc.), snus (like dipping tobacco but you don't need to spit), dissolvable tobacco (melts in your mouth), and e-cigarettes.

(I'm not getting into the debate over whether e-cigs should count as a kind of tobacco product. There is no tobacco in e-cigarettes. But the nicotine in e-cigs is often – not always – made from tobacco. It's arguable either way, and except when trying to interpret broadly written laws and regulations it's not what matters.)

The entire report runs just nine paragraphs.

If you read those nine paragraphs carefully and objectively, the big news is that between 2011 and 2014 teenagers' e-cigarette use went up while their real cigarette use went down – so much so that in 2014 more middle and high school kids reported recently using e-cigs than real cigs. Kids' overall tobacco use didn't change significantly during the past three years. But the kinds of tobacco kids used did change, and the main change was from smoking to vaping.

Not just from real cigarettes to e-cigarettes. From smoking to vaping. That is, it's not just kids' cigarette use that went down. Total smoking (hookahs, cigarettes, cigars, pipes, and bidis) went down too between 2011 and 2014, even though hookah use – part of the total – rose precipitously. Here are the relevant high school smoking numbers:

Hookahs	4.1% to 9.4%	+5.3%
Cigarettes	15.8% to 9.2%	-6.6%
Cigars	11.6% to 8.2%	-3.4%
Pipes	4.0% to 1.5%	-2.5%
Bidis	2.0% to 0.9%	-1.1%

Between 2011 and 2014, while high school e-cig use soared from 1.5% to 13.4%, high school smoking declined.

The middle school numbers show the same pattern: hookah use up from 2011 to 2014, every other kind of smoking down, total smoking down.

You can't simply add up the five kinds of smoking numbers to calculate *how much* teenage smoking declined, since a lot of kids reported using more than one combustible product. In some previous years, the MMWR reports on the National Youth Tobacco Surveys included data on the percentage of middle and high school students who used any combustible tobacco product, allowing direct quantitative comparisons: change in total smoking from year to year, and total smoking versus total vaping versus total use of other tobacco products. This key number – how many kids in 2014 said they had smoked some kind of tobacco in the previous month – has not yet been released. But it's clear from the numbers we do have that total smoking is down.

When the 2014 total smoking number is eventually released, it will be interesting to see

whether or not the CDC makes a big deal out of the “Teen Smoking Down” story, the way it made a big deal out of the “Teen Vaping Up” story in April 2015.

The rate of decline in youth cigarette smoking over time is also worth noting. From 2000 to 2011, the number of high school students who smoked cigarettes declined by an average of 1.1% per year. From 2011 to 2014, the decrease averaged 2.2% per year. The middle school average annual decline hasn’t accelerated this way; it averages a steady 0.6% per year throughout.

With these facts in mind – overall teen smoking down, teen cigarette smoking down at a faster rate than the previous decade – now consider the focus of the MMWR report.

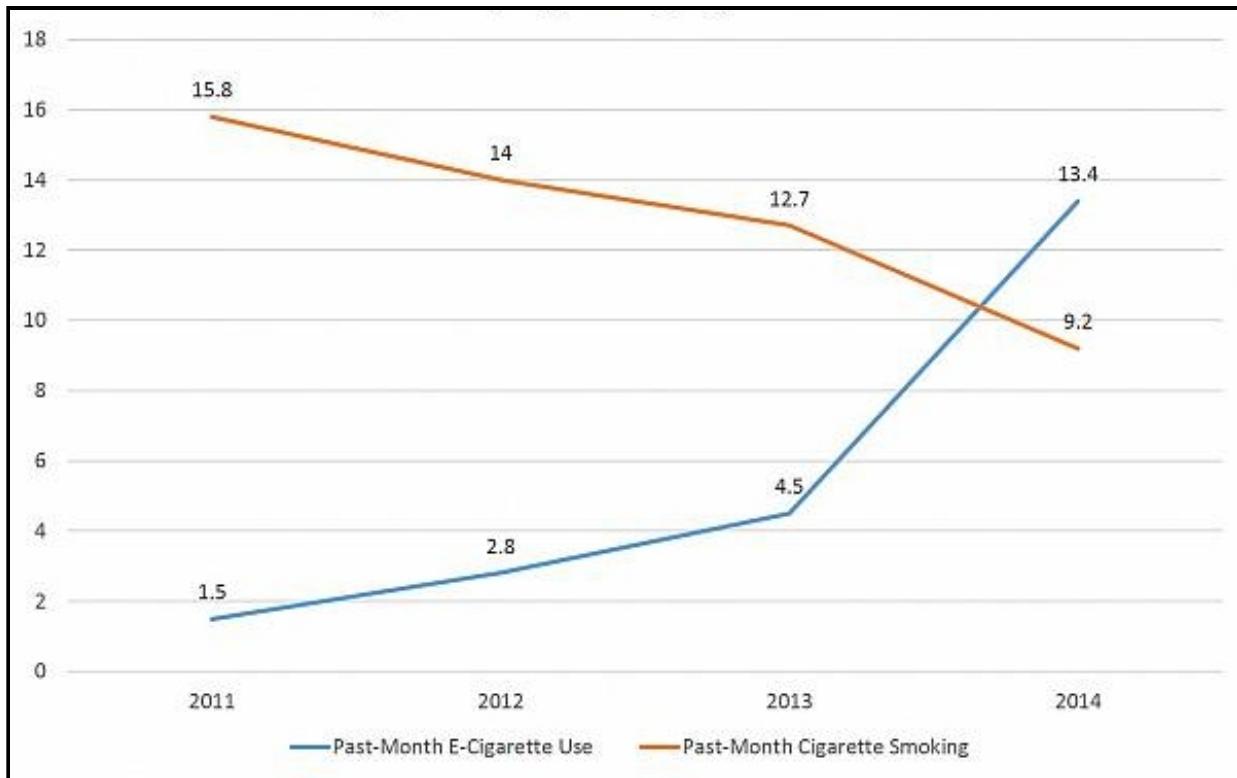
The report’s first paragraph summarizes what the authors consider most important in the rest of the text. Here it is, with references and a sentence on methodology omitted:

Tobacco use and addiction most often begin during youth and young adulthood. Youth use of tobacco in any form is unsafe.... In 2014, e-cigarettes were the most commonly used tobacco product among middle (3.9%) and high (13.4%) school students. Between 2011 and 2014, statistically significant increases were observed among these students for current use of both e-cigarettes and hookahs ($p<0.05$), while decreases were observed for current use of more traditional products, such as cigarettes and cigars, resulting in no change in overall tobacco use. Consequently, 4.6 million middle and high school students continue to be exposed to harmful tobacco product constituents, including nicotine. Nicotine exposure during adolescence, a critical window for brain development, might have lasting adverse consequences for brain development, causes addiction, and might lead to sustained tobacco use. For this reason, comprehensive and sustained strategies are needed to prevent and reduce the use of all tobacco products among youths in the United States.

The paragraph stresses that teenage e-cig and hookah use increased from 2011 to 2014, while total tobacco use didn’t change. It acknowledges that “current use of more traditional products, such as cigarettes and cigars” decreased. It doesn’t bother to point out that overall teenage smoking decreased too. In fact, some of the numbers I needed to draw the conclusion that overall teenage smoking decreased aren’t in the April 2015 report. I had to get them from an earlier report.

All these numbers together still don’t prove that vaping has replaced smoking for a lot of teenagers. The annual surveys can’t tell us how many vapers will “progress” to smoking in the next few years. And they can’t tell us whether teenage cigarette (cigar, etc.) use would have gone down between 2011 and 2014 even if e-cigs had never been invented. Teen smoking started declining well before teen vaping started rising. So maybe the last three years’ rise in vaping isn’t contributing to the last three years’ decline in smoking. Maybe smoking would have declined just as much – or more – if nobody were vaping. Maybe vaping is just a new, somewhat bad habit that is completely unconnected to the old, much worse bad habit (smoking) that’s in overall decline despite the increased popularity of hookahs.

E-Cigarette and Real Cigarette Use Among High School Students, 2011–2014



(Sources: Data Chart)

But for sure teenage smoking is down. That's wonderful news, made only a little less wonderful by the fact that teenage vaping is up. And insofar as the *MMWR* report yields evidence about whether vaping is a gateway to smoking (the big bad effect) or a replacement for smoking (the big good effect), it suggests that in adolescents, at least so far, the replacement hypothesis is the likelier of the two.

The report doesn't address this question, not in this first paragraph and not elsewhere in the report either. The summary paragraph neatly avoids the gateway-versus-replacement question by focusing instead on the fact that overall tobacco use is unchanged, as if the kind of tobacco use made no difference. "Youth use of tobacco in any form is unsafe.... 4.6 million middle and high school students continue to be exposed to harmful tobacco product constituents.... Comprehensive and sustained strategies are needed to prevent and reduce the use of all tobacco products among youths in the United States."

Consider these comparisons:

- Imagine that teenage pregnancy was down and oral sex was up, and the U.S. government stressed that there was no change in overall teen sexuality and all sexual activity has risks.
- Imagine that sales of energy-wasting appliances were down and sales of energy-saving appliances were up, and the U.S. government pointed out that overall appliance sales were flat and all appliances use energy.
- Imagine that motorcycle riding without helmets was down and motorcycle riding with helmets was up, and a U.S. government report on the trend focused on no change in overall motorcycle riding.
- Imagine that gun battles were down and fisticuffs were up, and the U.S. government stayed steadfastly fixated on no change in overall violent behavior.

If it's hard to come up with a comparison that isn't laughable, maybe that's because the failure to distinguish between smoking risk and vaping risk is itself so laughable. At least it would be laughable if it weren't deadly.

The sentence in this first paragraph on the health effects of nicotine is worth reading slowly. Remember, smoking kills chiefly because of the tar produced when you burn tobacco; e-cigs don't burn tobacco and don't expose users to tar. Both smoking and vaping expose users to

nicotine. Here's the sentence: "Nicotine exposure during adolescence, a critical window for brain development, might have lasting adverse consequences for brain development, causes addiction, and might lead to sustained tobacco use."

The addiction is unquestionable. The rest of the sentence is two "mights."

Smoking kills. Vaping, the report implies, is just as bad as smoking because it *might* affect brain development and *might* lead to smoking. Or perhaps just to more vaping; that would count as sustained tobacco use too – but without the smoke, without the tar, and without the lung cancer, emphysema, etc. Both smoking and vaping might affect brain development, but only smoking does all that other damage as well.

Further down, the report provides additional evidence relating to the gateway-versus-replacement question in the data on respondents' use of more than one tobacco product over the previous month. In 2014, 24.6% of high school students reported using at least one tobacco product, including 12.7% (a little over half) who said they used more than one. In 2011, 24.2% reported using at least one tobacco product, including 12.5% who used more than one. Statistically, there was no change in high-schoolers' overall tobacco use and no change in their use of multiple tobacco products. For middle school students, the number using more than one tobacco product in the previous month went down from 3.8% to 3.1%, a statistically significant decline.

In other words, kids didn't just add e-cigarettes to their tobacco use repertoire. If a lot of kids who already smoked had started experimenting with e-cigs while also continuing to smoke at least once a month, the number using more than one tobacco product should have increased. It didn't. Kids' use of e-cigs and hookahs went up. Their use of real cigs, cigars, pipes, bidis, and snus all went down. (There was no statistically significant change for smokeless tobacco and dissolvable tobacco.) The evidence is far from ironclad, but it certainly points to the replacement hypothesis, not the gateway hypothesis.

The discussion section of the report – the last four of its nine paragraphs – pays no attention to the gateway-versus-replacement debate, or to the debate over the comparative risk of e-cigs versus real cigs. In fact, it works hard to distract attention from both debates.

Consider this sentence:

The increases in current use of e-cigarettes and hookahs offset the decreases in current use of other tobacco products, resulting in no change in overall current tobacco use among middle and high school students.

In other words, the increase in a maybe-a-little-dangerous activity (vaping) is seen as *offsetting* the decrease in a for-sure-incredibly-dangerous activity (smoking), "resulting in no change"!

Imagine if that sentence had been followed by these two, written by me:

However, the absence of any change in overall current use of tobacco products should not obscure the substantial decline in overall current use of tar-producing combustible tobacco products. Even with the growing popularity of hookahs, fewer kids are smoking tobacco in 2014 than in 2011.

Can you see the headlines? "Teen Tobacco Smoking Down Despite Steep Rise in Hookah Use." "Kids May Be Vaping Instead of Smoking." Apparently those are not the headlines the CDC wanted.

Here's what the report actually says:

Youth use of tobacco in any form, whether it be combustible, noncombustible, or electronic, is unsafe....

Because use of emerging tobacco products (e-cigarettes and hookahs) is increasing among middle and high school students, it is critical that comprehensive tobacco control and

prevention strategies for youths should address all tobacco products and not just cigarettes.

For the record, I agree that it's wise to try to keep kids from getting hooked on any tobacco product. But a tobacco policy that ignores the comparative risk of vaping versus smoking cannot be considered a serious health-based policy. And a tobacco-related survey report that papers over the comparative risk of vaping versus smoking should have no place in a serious public health journal like *MMWR*.

What might lead 12 public health experts to coauthor a report that papers over the comparative risk of vaping versus smoking? I don't know. Something deeply ideological, I think. Something puritan and fundamentalist. All tobacco use is (equally) evil because it all enriches the tobacco industry? All tobacco use is (equally) disgusting because it all enables users to get illicit pleasure?

Or maybe it's a kind of public health expansionism – the anti-smoking establishment poaching on adjacent turf.

I don't actually think the public health profession is so outraged at tobacco users that it wants to discourage a comparatively safe product like e-cigs in order to force those who are stupid or weak enough to use tobacco at all to use it in its most dangerous forms and die.

Nor do I suppose that the public health profession is in thrall to the big pharmaceutical companies that make millions every year from the sale of patches, gums, and other nicotine-delivery systems that compete with e-cigs in the smoking cessation market.

A likelier possibility is that public health experts and officials are so frustrated and so outraged that another generation of children is becoming addicted to nicotine that they have allowed themselves to dismiss as if it were irrelevant the much lower health risk of nicotine delivered in vapor compared to nicotine delivered in smoke.

Or maybe, despite the paucity of evidence, the experts and officials have a hunch that e-cigs will turn out to be a gateway to real cigs or just as dangerous as real cigs ... or both. That hunch might even turn out right. But they write as if they were self-evidently right, as if the case didn't have to be made, as if any idiot should know that when teenage vaping goes up and teenage smoking goes down, that's not good news.

The news release

The April 16 CDC news release about the *MMWR* report does what news releases are supposed to do: It simplifies the report and highlights its most newsworthy angle, while remaining faithful to its main thrust. So insofar as the report obscures the good news in the National Youth Tobacco Use surveys – that teenage smoking keeps going down – the release obscures it even more.

The news release headline tells the tale. It focuses on a fact plucked from the middle of the fifth paragraph of the *MMWR* report: that kids' e-cig use tripled from 2013 to 2014.

**E-cigarette use triples among middle and
high school students in just one year
Hookah use doubles; no decline seen in
overall tobacco use among middle or high school students**

So kids' use of e-cigs and hookahs is way up, and there's no decline in their overall tobacco use. Bad news and then more bad news. What didn't make the headline, obviously, is the good news – that kids' real cigarette use is down (down at a faster rate than previously), that kids' total smoking is also down, and that it even looks like vaping might be replacing adolescent smoking instead of leading to it.

The body of the news release runs 11 short paragraphs. The first two grafts do what news

"ledes" should do. They summarize the main thrust of the release: that the annual survey found a huge increase in students' e-cig use from 2013 to 2014, and that in 2014 for the first time students' e-cig use surpassed their use of any other tobacco product, even real cigarettes.

The third graf features CDC Director Tom Frieden explaining why e-cigs are dangerous – implicitly as dangerous as real cigs – and why the news is therefore bad news:

"We want parents to know that nicotine is dangerous for kids at any age, whether it's an e-cigarette, hookah, cigarette or cigar," said CDC Director Tom Frieden, M.D., M.P.H.

"Adolescence is a critical time for brain development. Nicotine exposure at a young age may cause lasting harm to brain development, promote addiction, and lead to sustained tobacco use."

The MMWR report says that nicotine "might" harm brain development and "might" lead to sustained tobacco use. The Frieden quote in the release is still tentative but a little more confident; "might" has become "may."

As for Frieden's first sentence, in what other arena does a public health official emphasize that two different risks are both risky, without pointing out that one is much riskier than the other? Compare:

Frieden: "We want parents to know that nicotine is dangerous for kids at any age, whether it's an e-cigarette, hookah, cigarette or cigar."

Sandman: "We want parents to know that the polio virus is dangerous for kids at any age, whether it's an oral polio vaccine virus or a wild polio virus."

Yes, my comparison sentence is even more misleading than Frieden's original. The wild polio virus is vastly more dangerous than the live-but-attenuated virus in the oral polio vaccine (not used in the U.S. anymore). Almost certainly the comparative risk analysis yields a bigger gap for oral vaccine versus wild polio than for e-cig versus real cig. And there's unequivocal science to prove that the oral polio vaccine protects against the wild polio virus, whereas it's anybody's guess to what extent e-cigs might help keep kids from using real cigs.

But Frieden's sentence is misleading enough: choosing to obscure the difference between the two risks and ignoring the possibility that the smaller risk (vaping) might be replacing the bigger one (smoking).

You'd almost think that "harm reduction" wasn't a fundamental public health concept. In other contexts, Frieden has long been a strong supporter of harm reduction. When he ran New York City's health department, for example, he spoke out strongly in favor of needle exchange programs. "People may think we're condoning immoral behavior," he said in 2005, "but our perspective is you take the world as it is and try to make it a better, safer place." He clearly does not believe the same rationale should be applied to electronic cigarettes.

The fourth graf of the news release finally finds a way to sneak in the fact that students' use of real cigarettes went down. That fact couldn't be left out entirely. But the release writer apparently felt it could be relegated to a clause hidden in the middle of the fourth paragraph, which focuses on the increased use of hookahs. I've italicized the buried clause so you won't miss it. (All the statistics in this graf refer to changes from 2013 to 2014, not to the longer 2011–2014 period.)

Hookah smoking roughly doubled for middle and high school students, while *cigarette use declined among high school students and remained unchanged for middle school students.*

Among high school students, current hookah use rose from 5.2 percent in 2013 (about 770,000 students) to 9.4 percent in 2014 (about 1.3 million students). Among middle school students, current hookah use rose from 1.1 percent in 2013 (120,000 students) to 2.5 percent in 2014 (280,000 students).

The fifth graf does mention again that cigarette (and cigar) use declined. It puts that decline in the most discouraging context possible: as something that was "offset" by increases in e-

cigarette and hookah use. As you read the paragraph quoted below, note that the comparison it makes is between “traditional” tobacco products (cigarettes, cigars, etc.) and newly popular products (e-cigs and hookahs) – not the far more important comparison between tobacco products that burn and produce tar and tobacco products that don’t. The traditional-versus-new frame enables the writer to put dangerous hookah use in the same category as much-less-dangerous e-cig use, thus sustaining the claim that one trend (hookahs plus e-cigs) has “offset” the other (cigarettes, cigars, etc.).

Note also that the size of the decline in cigarette use isn’t specified; in a news release full of statistics, that’s one statistic the writer thought worth leaving out. Also tellingly missing from this graf and from the entire release, as it is missing from the MMWR report itself: the fact that total teenage smoking is down too.

The increases in e-cigarette and hookah use offset declines in use of more traditional products such as cigarettes and cigars. There was no decline in overall tobacco use between 2011 and 2014. Overall rates of any tobacco product use were 24.6 percent for high school students and 7.7 percent for middle school students in 2014.

The next two grafs (not quoted here) provide more statistics and regulatory background, setting up the following stunning quotation in Paragraph 8:

“In today’s rapidly evolving tobacco marketplace, the surge in youth use of novel products like e-cigarettes forces us to confront the reality that the progress we have made in reducing youth cigarette smoking rates is being threatened,” said Mitch Zeller, J.D., director of FDA’s Center for Tobacco Products. “These staggering increases in such a short time underscore why FDA intends to regulate these additional products to protect public health.”

There is a reasonably strong case to be made for regulating e-cigarette use, especially among adolescents and at least until we learn more about the health effects of e-cigs and their relationship to smoking. But on what basis does Zeller see the surge in e-cig use as evidence that progress in reducing youth cigarette smoking is “threatened”? The survey data show that progress in reducing youth cigarette smoking is continuing and has even accelerated, and suggest (albeit tentatively) that e-cigs may be contributing to that progress. Most of the news release obscures these facts, as does the MMWR report. The Zeller quote flat-out denies them.

The rest of the news release is pretty much boilerplate about what the U.S. government is doing to fight tobacco use, how the National Youth Tobacco Surveys are conducted, and where smokers can get more information about quitting. It does pause to remind readers of the key point (as the CDC sees it): “The report also concludes that because the use of e-cigarettes and hookahs is on the rise among high and middle school students, it is critical that comprehensive tobacco control and prevention strategies for youth focus on all tobacco products, and not just cigarettes.”

The press briefing

On the afternoon of April 16, CDC Director Frieden held a press briefing about the MMWR report, accompanied by Brian King of the CDC’s Office on Smoking and Health. It was a small affair. Only six reporters asked questions, fewer than at most CDC press briefings I have analyzed. The whole thing lasted only 23 minutes.

As is often the case, not much from the press briefing made it into the subsequent media coverage.

Although the press briefing seemed to have little impact on media coverage, the transcript is worth analyzing for the way the briefing exaggerated the findings in the already misleading MMWR report. Frieden had the report and the news release to guide him, and maybe a list of talking points as well. But without a script, and without time and staff to revise his remarks, he went further in a misleading direction than the report or the release had gone. And in response to questions (and even in anticipation of questions), Frieden and King had to address the gateway-versus-replacement controversy that the report and the release had dodged. Though I

am sure Frieden would have wanted it otherwise, gateway-versus-replacement became the dominant topic of the briefing.

The MMWR report and the news release about the report seem carefully crafted to convey the “right” messages without actually misstating facts. But the press briefing was a looser format, and Frieden ended up going further in a deceptive direction on three topics.

On kids’ overall use of tobacco products

Frieden’s introductory remarks began with the same lede angle as the news release: “The MMWR report we’re releasing today outlines tobacco use among middle and high school students. It contains a very alarming finding. There are now 2.5 million kids using e-cigarettes and 1.5 million using hookah. In just one year, the number of kids using hookah doubled, and the number of kids using e-cigarettes appears to have tripled.”

Frieden didn’t mention the continuing decline in adolescent use of cigarettes, cigars, and pipes. Instead, his next sentence pulled out of the report a fact that the report’s authors hadn’t discussed at all. “Furthermore,” he went on, “these increases are driving an uptick in the total number of our children who are using tobacco products for the first time in a generation. There’s been an increase of 400,000 in the number of middle and high school kids who are using one or more tobacco product.”

There’s a reason why the MMWR report doesn’t address this “uptick” in kids’ overall tobacco use. It was too small to pass the test of statistical significance; that is, the chances were greater than one-in-twenty that the uptick was illusory, an accident of sampling rather than a real finding. The authors of the report and the news release therefore followed the standard protocol for reporting scientific results, treating adolescent overall tobacco use as unchanged. But Frieden decided to emphasize the uptick.

Even though the uptick isn’t solid enough to lean on as a scientific finding, it is more than likely real. Frieden was entitled to discuss it if he wanted, but only if he pointed out that it isn’t statistically significant. I suspect someone may have passed him a note to that effect, because later in the press briefing he went back to correct the record … sort of:

I would like to say one more thing about the previous question that was asked. What we saw from 2013 to 2014 was an expansion by 400,000, which is large, although it’s only a one-year trend. We don’t know that it’s statistically significant. But it’s the first uptick we’ve seen in a generation. So if the argument was that they’re [e-cigs] replacing the use [of combustible tobacco], we wouldn’t see the total expansion in the number of kids smoking.

The reason I say Frieden only sort-of corrected the record isn’t because he misspoke at the end and called the uptick in total tobacco use an “expansion in the number of kids smoking.” That was pretty clearly just a slip, saying “smoking” when he meant to say “using tobacco.” What’s more revealing is that he couldn’t bring himself to say he knew the uptick was not statistically significant; the closest he would come was to say “we don’t know that it’s statistically significant.”

Frieden’s clarification also tells us why he wanted to talk about the uptick in the first place. He saw it as a rationale to argue that vaping wasn’t replacing smoking but rather supplementing it. To make this case he ignored not just the small size of the uptick in the number of kids using any tobacco product, but also the absence of any uptick at all in the number of kids using more than one tobacco product, the decline in the number of kids smoking cigarettes, and the decline in the number of kids smoking anything.

The real issue here isn’t Frieden’s decision to lean on a statistically insignificant increase in kids’ overall tobacco use to argue against the replacement hypothesis. The real issue is adding apples and oranges. Combining e-cig use, real cig use, and the use of seven other tobacco products into one overall number (the percentage of kids using any tobacco product) means treating the distinction between vaping and smoking as if it were unrelated to health. This is especially deceptive in the absence of any discussion of the decline in total teen smoking

between 2011 and 2014.

In that, of course, the press briefing was merely following in the footsteps of the *MMWR* report and the news release.

On the health effects of nicotine

Frieden's introductory remarks at the press briefing also went further than the *MMWR* report and the news release in addressing the emerging evidence (largely from animal studies) that nicotine might do damage to young people's developing brains. The report had used the same word I am using to describe the level of confidence the authors attached to this evidence: "might." The news release switched from "might" to "may." There is far less tentativeness in Frieden's introductory remarks:

It's important that everyone, parents and kids, understand that nicotine is dangerous for kids at any age, whether it's an e-cigarette, hookah, cigarette, or a cigar. In fact, these trends are particularly worrisome because human brain development is still in process in these years.... Smoking cigarettes during adolescence has been associated with lasting cognitive impairments, including memory and attention, and although accurate quantification in humans is difficult, animal studies have compelling additional evidence that nicotine exposure causes both long-term structural and functional changes to the brain. These are substantial and in many different parts of the brain.

Frieden came back to nicotine-induced brain damage several times in the press briefing. Sometimes he said it was "likely." Sometimes he just said it was true:

- "In the case of kids, e-cigarettes are harmful all by themselves because of the effects of nicotine on children's brains."
- "We know that nicotine is harmful to the developing brain and we could be seeing another generation getting hooked."
- "...we do know that an increase in the number of kids using an addictive substance that's likely to harm their brains is not a good thing."
- "And the fact that kids in increasing numbers are using an addictive product that is harmful to their brains is a real problem."
- "...and regardless of whether they then progress to using other combustible products, they're using the products that likely damage their brain...."

I am not qualified to assess the health significance of research findings that suggest the possibility of nicotine-induced brain damage in adolescent humans. But there are two points I am qualified to assert. First, the press briefing is a great deal more expansive and confident about these findings than the *MMWR* report or the news release. And second, it is extremely difficult to find any discussion of nicotine-induced brain damage in prior or current public education materials on the health effects of *smoking*. When the CDC and other agencies are telling kids not to smoke, they list lots of health effects, but this is rarely if ever one of them.

If nicotine-induced brain damage is a paramount reason to oppose adolescent e-cig use, and if e-cig risks are comparable to real cig risks, then why can't I find references to nicotine-induced brain damage in anti-smoking literature?

Here are a few of the many U.S. government online sources of tobacco risk information that do not mention nicotine-induced brain damage as of May 26, 2015:

- The CDC webpage on "Health Effects of Cigarette Smoking." This page was last updated November 21, 2014. If you come across a version updated later than that, the November 21 version is stored on the Internet Archive.
- A 2014 FDA news release describing its first-ever national anti-smoking public education campaign aimed at youth.
- The Department of Health and Human Services website on that FDA campaign, "The Real Cost" of smoking. The "Addiction" section does mention the well-established and often-discussed fact that teen brains are more vulnerable to nicotine addiction.

- The Surgeon General's 2012 report on "Preventing Tobacco Use Among Youth and Young Adults."

But the Surgeon General's 2014 report on "The Health Consequences of Smoking" does discuss nicotine-induced brain damage. The report grades the evidence for each possible health effect it covers as either "sufficient," "suggestive" or "insufficient." Its judgment of the quality of the evidence on behalf of nicotine-induced brain damage: suggestive. The 2014 Surgeon General's Report also states unequivocally: "The burden of death and disease from tobacco use in the United States is overwhelmingly caused by cigarettes and other combusted tobacco products." Smoking, in other words. Not vaping.

It is hard to imagine why the CDC could be so worried about nicotine's effects on the brains of vapers and so unworried about nicotine's effects on the brains of smokers. But it is all too easy to imagine CDC officials needing a scientific, health-related rationale for their opposition to electronic cigarettes (other than addiction itself), scrounging around in the research literature for something to lean on, and coming up with suggestive evidence about the possibility of nicotine-induced brain damage. The MMWR report was tentative about this possibility. CDC Director Frieden's press briefing was not.

In thinking about the comparative risk of vaping and smoking, it is important to remember that the correct comparison isn't nicotine risk versus tar risk. It is nicotine risk (vaping) versus tar plus nicotine risk (smoking). I would have liked a reporter to ask: "But which is worse, a product that might harm kids' brains and certainly harms their lungs, hearts, and other organs, or a product that might harm kids' brains while sparing their lungs, hearts, etc.?"

Kathleen O'Brien of the *Newark Star-Ledger* came close, asking if there's any survey data showing whether adolescents *believe* e-cigs are safer than real cigs. Brian King gave an interesting answer: "There's advertising claims by a lot of companies essentially alluding to the fact that these [e-cigs] are potentially more safe than conventional products. So the studies that have been released to date do demonstrate that youth as well as adults perceive them as less harmful and this isn't surprising considering there's marked advertising by several companies that are alluding to this."

What King (and Frieden) didn't say is that the vast majority of experts also "perceive" e-cigarettes as less harmful than real cigarettes. King and Frieden couldn't quite bring themselves to say this perception is mistaken. They just kept finding ways to imply it's mistaken.

As we will see in the next section, reporters gave Frieden other chances to say something they all knew is almost certainly true: that vaping is safer than smoking. He wouldn't say it.

On the gateway-versus-replacement debate

At least the press briefing paid explicit attention to the crucial debate over the extent to which e-cigs increase or decrease real cigarette use – a debate the MMWR report and the news release mostly evaded. Frieden concluded his introductory remarks by staking out the CDC's position in the debate: "It would be a mistake to suggest there is a causal relationship between the increase in e-cigarette use and the decrease in child tobacco use." An interesting slip of the tongue. I assume he meant smoking here, or cigarette smoking; overall child tobacco use didn't decrease. "That child tobacco use [again he meant child smoking or child cigarette smoking] decrease preceded the big increase in e-cigarette use...."

Most of the handful of questions Frieden got focused on the decline in teenage smoking and the gateway-versus-replacement debate.

The first question, from Mike Stobbe of the Associated Press, asked whether the e-cigarette boom might be "at least partly a factor" in the smoking decline. Frieden didn't seize the chance to discuss the smoking decline and the possible role of e-cigs. He seemed to wish he hadn't raised the issue in the first place, and answered in a single, dismissive sentence: "[T]here's no evidence in teens that suggests that e-cigarettes are in any way necessary to or are actually

protecting kids from tobacco use."

The debate came back in a follow-up question from Toni Clarke of Reuters: "But what evidence do you have to sort of declaratively rule it out? You've got between 2013 and 2014 the biggest ever – as far as I can see, the biggest ever year-on-year decline in smoking. Do you attribute that entirely to conventional tobacco control measures?"

This time both Frieden and King responded:

TOM FRIEDEN: Well, we know that conventional tobacco control measures worked. We know that the FDA youth-directed tobacco campaign was released and really – there's a lot that we don't know. We don't have certainty about aspects of the trends, but we do know that an increase in the number of kids using an addictive substance that's likely to harm their brains is not a good thing. And we do know that with addiction the possibility of progression to other forms of tobacco is significant. We further know that although there was a great deal of hope that most adults who use e-cigarettes would be able to quit regular cigarettes, that is not what we've seen at this point. Brian, would you like to add to that?

BRIAN KING: I would like to reiterate that we really reject the notion we need to protect kids from cigarettes by allowing them to use a product like e-cigarette which is addictive and could harm their brain. The standard really should be that you should not be using any tobacco products because we know that it's unsafe, irrespective of [whether] it's combustible, non-combustible, or electronic.

Neither Frieden nor King cited any evidence that kids' growing use of e-cigarettes wasn't (or was) part of the reason for their declining use of real cigarettes. Neither claimed such evidence existed. Instead, both bridged to a different topic about which they had at least "suggestive" evidence: nicotine-induced brain damage. Both seemed to imply that they'd be opposed to e-cigs even if e-cigs did reduce teen smoking.

Bridging is what PR people teach their clients to do when asked a question they don't want to answer.

But Clarke didn't let it go. She bridged too, to the comparative risk of vaping and smoking and the fundamental public health standard of harm reduction:

TONI CLARKE: Okay. So you don't see any benefit basically in getting toward 30 percent reduction in smoking. You see that the equivalent – an equivalent risk for kids smoking e-cigarettes as they would smoke traditional cigarettes – you don't buy any kind of reduced harm argument in all of this?

TOM FRIEDEN: I think you have to look at the broader picture here. The question of reduced harm is a question of are more people going to be smoking dangerous products in the future? And the fact that kids in increasing numbers are using an addictive product that is harmful to their brains is a real problem. And I think if you look at the long history of tobacco products, filters, and low tar, there's the hope we're going to be able to figure out a way to make an addictive substance less harmful. And while it's likely the case with someone who only uses e-cigarettes compared to someone who uses conventional cigarettes. You have to reduce risk. For the life of the individual and the group of people at risk when that resulted in actual increase in the number of people who are using combustible products. It's something that is a major risk and certainly not something that we should count on not happening.

This isn't exactly coherent, but I think I get Frieden's drift. In the past, public health was seduced into being hopeful that filter cigarettes and low-tar cigarettes might be a less harmful form of tobacco addiction than ordinary cigarettes. That hope was dashed. So now public health will be damned if it's going to get hopeful again that maybe vaping could be a less harmful form of tobacco addiction than smoking. Instead, we should all worry that vaping might lead to smoking, and stay focused on the evidence that e-cigs damage kids' brains.

Frieden did succeed in not giving Clarke anything on gateway-versus-replacement that she

could use in her story. Like most of the coverage I looked at, her story made no use at all of the press briefing. She leaned on other sources to justify the last clause in her lede: "Electronic cigarette use among U.S. middle and high school students tripled in 2014 while cigarette use fell to record lows, according to provocative new data that is likely to intensify debate over whether e-cigarettes are a boon or bane to public health."

The two key debates regarding adolescent e-cig use – comparative risk and gateway-versus-replacement – were intertwined through much of the press briefing Q&A. The comparative risk debate is entirely about kids' current behavior: Stick for stick, are they safer vaping than smoking? The gateway-versus-replacement debate is mostly about kids' future behavior: If they vape now, are they more or less likely to smoke later?

Frieden and King are worried that vaping might lead to long-term future smoking. Reporters are interested in that question too, but they're also interested in the stick-for-stick current risk of an e-cig now versus a real cig now.

It would have been wise as well as honest for Frieden to acknowledge candidly that of course e-cigs are safer than real cigs (or any other combustible tobacco product), even though there is suggestive evidence that they might not be as safe as people think. That would have cleared the decks for him to make his case – a debatable case, but not a foolish case – that increased vaping now might lead to increased smoking later.

Kimberly Leonard of *U.S. News & World Report* took one more shot at the gateway-versus-replacement debate: "Are you saying that e-cigarettes are a gateway to smoking or can be?" To his credit, Frieden was unwilling to claim that the gateway possibility is more than a possibility. Instead, he returned to his main points – that e-cigarette use (and hookah use) is soaring, that it's addictive, that it's "likely" to cause brain damage, and that it "may" lead to smoking:

There are more studies underway that will help elucidate what is happening with teens who use e-cigarettes. And in some sense, time will tell because the numbers are so unprecedented. We're now seeing 2.5 million kids using e-cigarettes and 1.5 million using hookah, and regardless of whether they then progress to using other combustible products, they're using the products that likely damage their brain and is highly addictive and it may route ["result"] in combustible tobacco use in the future.

The coverage

The publication of the MMWR report was a newsworthy event. But it wasn't a big story – not big enough to justify a lot of reportorial digging. Not surprisingly, some of the coverage settled for the information and quotable quotes in the news release, perhaps supplemented with a couple of additional quotes from the press briefing or additional statistics from the report itself.

But a gratifying number of journalists went further.

In some cases the CDC did succeed in its efforts to control the story. I found coverage that slavishly stressed the tripling of teenage e-cig use from 2013 to 2014, coverage that accepted at face value the CDC's implication that e-cigs are as dangerous as real cigs, and coverage that ignored the possibility that the smoking decline that accompanied the vaping increase might suggest that e-cigs are replacing real cigs in the hearts and habits of teenagers.

But mostly what I found, especially in the longer stories, was coverage that *started* that way but ended quite differently.

In short, the CDC did successfully control the headlines and ledes of most of the stories written about the report. But plenty of reporters went elsewhere in the bodies of their stories. Some read the MMWR report carefully and decided the decrease in real cigarette use deserved to be highlighted, not deemphasized. And more than a few found the time – and the sources – to cover one or both of the two crucial debates that surround any comparison of electronic

cigarettes with real cigarettes: the comparative risk debate and the gateway-versus-replacement debate.

The NPR story, for example, was headlined “Use of E-Cigarettes Triples Among U.S. Teens.” The first two-thirds of the story follows the storyline emphasized in the news release, including the Frieden quote from the release. But the last third gets to some of the controversy that the release and the MMWR report didn’t address:

“The release of this survey couldn’t be better timed,” said Nancy Brown of the American Heart Association in a written statement. “The take-away message is loud and clear: Tobacco regulations need to be finalized now. We cannot stand by while more and more youth put themselves at risk for heart disease, stroke or even an early death.”

But the makers of e-cigarettes argue that the devices may be helping drive down the rate of regular cigarette use among teens.

“While the use of vapor products by teens should be discouraged, the data is clear that as teen experimentation with vaping has grown over the last three years, youth smoking has experienced the largest decline in the history of the … survey,” Gregory Conley, of the American Vaping Association, told Shots in an email.

“This dramatic fall in teen smoking should be part of the discussion,” Conley said, “but the CDC deemed this finding to not be worthy of a single line in their press release. That is not surprising, as it would interfere with the CDC’s evidence-free attempts to paint e-cigarettes as a potential gateway to traditional cigarettes.”

The *USA Today* story also stuck with the news release for its headline and lede:

Teen e-cigarette use tripled in the past year

The percentage of teens using e-cigarettes tripled from 2013 to 2014, according to a new report from the Centers for Disease Control and Prevention.

Two million teens, 13.4% of high school students, used e-cigarettes in 2014, up from 4.5% in 2013 and 1.5% in 2011. Among middle-schoolers, e-cigarette use rose from 1.1% in 2013 to 3.9% in 2014, representing about 450,000 students, the report says.

But a few paragraphs later, reporter Liz Szabo turned to outside sources to get into some other aspects of the story: an anti-smoking advocacy group head who expressed both a high level of worry about the increase in teens’ e-cig use and a high level of gratification about the decrease in teens’ real cig use; an e-cigarette industry spokesman who said that maybe the former was contributing to the latter but nonetheless asserted that kids shouldn’t be allowed to vape; and an FDA official who explained the agency’s efforts to get e-cigs regulated.

Similarly, the *New York Times* story has the “right” headline, and gives the lede angle an attractive feature treatment – but then (according to what I assume is the CDC’s perspective) goes off the rails:

Use of E-Cigarettes Rises Sharply Among Teenagers, Report Says

Kenny, a high school senior in Weston, Fla., likes to puff e-cigarettes during study sessions with friends after school. James, a senior in Fauquier County, Va., uses them outside at lunch with friends who do smoke tricks. Tom, a sophomore from Westchester County, uses them while hiking with friends.

E-cigarettes have arrived in the life of the American teenager.

Use of the devices among middle- and high school students tripled from 2013 to 2014, according to federal data released on Thursday, bringing the share of high school students who use them to 13 percent – more than smoke traditional cigarettes.

About a quarter of all high school students and 8 percent of middle school students – 4.6 million young people altogether – used tobacco in some form last year. The sharp rise of e-cigarettes, together with a substantial increase in the use of hookah pipes, led to 400,000 additional young people using a tobacco product in 2014, the first increase in years, though researchers pointed out the percentage of the rise fell within the report's margin of error.

But the report also told another story. From 2011 to 2014, the share of high school students who smoked traditional cigarettes declined substantially, to 9 percent from 16 percent, and use of cigars and pipes ebbed too. The shift suggested that some teenage smokers may be using e-cigarettes to quit.

Smoking is still the single-biggest cause of preventable death in the United States, killing more than 480,000 Americans a year, and most scientists agree that e-cigarettes, which deliver the nicotine but not the dangerous tar and other chemicals, are likely to be far less harmful than traditional cigarettes.

The numbers came as a surprise and seemed to put policy makers into uncharted territory....

Conclusion

Bottom line: The MMWR report, the CDC news release accompanying the report, and the CDC press briefing about the report are all seriously misleading about the findings of the annual National Youth Tobacco Surveys. The press briefing is the most explicitly misleading of the three, but the news release almost certainly had the most influence on coverage and thus on what the public learned.

All three go out of their way to distort the study results and the underlying facts on four key points:

- They highlight the bad news (potentially, maybe, somewhat bad news) that teenage e-cigarette use has soared.
- They obscure the good news (definitely, wondrously good news) that teenage real cigarette use and overall smoking are continuing to decline, despite an increase in the use of hookahs.
- They assert that e-cigarettes are dangerous, imply that e-cigarettes are as dangerous as real cigarettes, and hide that virtually all experts agree e-cigarettes are significantly safer than real cigarettes.
- They ignore or deny the suggestive evidence (suggestive but far from conclusive) that teenage vaping might be replacing smoking, not leading to it.

I stand by the judgment in my title that the news release is a promising candidate for most dangerously dishonest public health news release of the year.

I have amply documented why I think the MMWR report, the news release, and the press briefing are dishonest. It's not a moustache-twirling sort of dishonesty. I assume that the public health professionals and public health communicators associated with the attack on e-cigs genuinely believe that e-cigs are bad. Not just bad; bad enough that they feel justified in attacking e-cig use in less-than-honest ways. Bad enough, even, that they stop noticing the ways in which their attack is less than honest.

But why do I insist on "dangerous"?

Over the years, I have periodically commented that over-dramatization and even exaggeration are more acceptable in warnings than in reassurances – that is, more acceptable in precaution advocacy than in outrage management. I went even further in a 2010 Guestbook entry on "Prospects for persuading activists and public health officials to be more honest," writing: "Dishonesty – or at least exaggeration – is genuinely more acceptable when trying to warn people than when trying to reassure them."

The CDC is arguably following my playbook when it over-dramatizes / exaggerates /

misrepresents the risk of electronic cigarettes. So why am I so critical? My wife and colleague Jody Lanard has long disagreed with what she sees as my excessively tolerant near-endorsements of dishonest warnings by activists. Have I changed my mind and come to see things her way?

To some extent I have. But there are also two differences that make me more critical of the way the CDC misrepresented the results of the National Youth Tobacco Surveys than I am of most other cases of exaggerated precaution advocacy.

The first difference is simply that the CDC isn't an activist group. It is a U.S. government agency – and not just any U.S. government agency, but an agency that claims to be guided by scientific evidence. The CDC has more credibility than activist groups. And the CDC *needs* more credibility than activist groups, especially when its task isn't to warn but to reassure. When the CDC asserts that a particular vaccine is safe, for example, its credibility is crucial to public acceptance of that vaccine. Most people figure it's part of an activist's job to exaggerate risks – so activists can exaggerate without losing a lot of credibility even when they're "caught." But if the CDC is caught exaggerating the risk of e-cigs, the damage to its reputation is likely to be greater, and the resulting damage to public health is likely to be more consequential.

The other difference is that the CDC isn't just exaggerating the risk of e-cigs. It is misrepresenting the comparative risk of e-cigs and real cigs. And it is denying the possibility that vaping might help woo some teenagers from smoking or keep them from starting to smoke in the first place. I frankly don't care much if the public ends up believing that electronic cigarettes are more dangerous than they really are. But I care enormously if the public – and especially the teenage public – ends up believing that vaping is just as dangerous as smoking so they might as well smoke.

Several surveys have shown that while most Americans and most American teenagers still believe that vaping is safer than smoking, the number who believe that vaping and smoking are equally dangerous has climbed substantially. Making that number continue to climb is a key goal of the public health "education" campaign against electronic cigarettes, one small recent piece of which I have discussed in this column.

Frieden's hope is that the campaign will convince adolescents and others that since e-cigs are no safer than real cigs they should avoid tobacco products altogether.

My worry is that the campaign will convince adolescents and others that since e-cigs are no safer than real cigs they might as well smoke the real thing. (My other worry is that the campaign will convince adolescents and others that public health education campaigns are not to be trusted.)

Nobody knows yet which effect will turn out more common. But we do know with near-certainty which effect will turn out more harmful. A kid who vapes instead of having nothing to do with tobacco is addicting herself to a habit that might have a deleterious effect on her cognitive development. A kid who smokes instead of vaping is addicting himself to a habit that is very likely to kill him, and also might have a deleterious effect on his cognitive development.

Thus, even if the four distortions I have documented in this column often have the effect Frieden is hoping for and only occasionally have the effect I am worried about, the combined impact of the two effects on public health will be negative. Successfully persuading kids that vaping is no safer than smoking will presumably reduce the number of vapers and increase the number of smokers. If the evidence continues to show that vaping is a lot safer than smoking, this is a bad tradeoff.

That's my case for "dangerous."

But at least with regard to this April 2015 example, I am encouraged and somewhat surprised that much of the media coverage mitigated the danger posed by these four distortions. If you read or watched or listened to some of the shorter news stories, or just the first part of virtually

any of the news stories, you probably got the misimpressions the CDC intended you to get. For you, the CDC's much-vaunted "SOCO" – its "Single Overriding Communication Objective" – was achieved.

But if you read or watched or listened to some of the longer and better stories, and stayed with them till the end, you got much closer to the truth – no thanks to the CDC.

My wife and colleague Jody Lanard provided additional research for this column and some of the text.

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